DM*-TURRETS

CONTROL UNIT TMC-**-400-**-****/11

HARDWARE & SOFTWARE INSTALLATION MANUAL

FW 1.1x
FW 2.xx

Original instructions.

The information described in this manual may be subject to variations due to technical modifications.
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1. GENERAL INFORMATION

The **Duplomatic TMC** control unit is a compact system that controls all functions regarding positioning and driving of the **Duplomatic DM* turrets**. The interfacing to the lathe is powerful and simplified for an easy installation. Serial line RS232 is set for diagnostic and remote control by PC.

CODE OF THE CONTROL UNIT

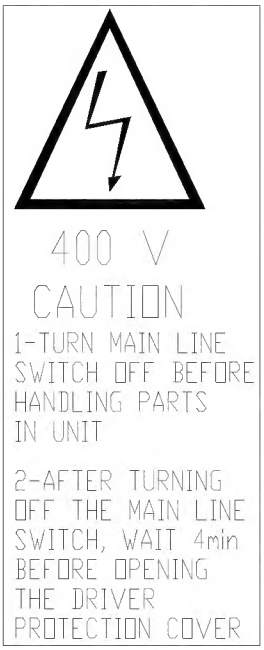
MODEL:TMC-10-400-12-16-1.2/11
Code: 0497010251
S/N *********
SET FOR: DM-16 S/N XXXXXXXX

The code of the TMC control unit is composed by two parts:
The first part of 7 digits is reserved for the Hardware code (related to voltage supply, nominal current, PCB release), while the remaining 3 digits are used to detail the configuration of the turret to be driven (size, inertia, n°of tools).

For example, a TMC control unit for DM 16, 400V supply with inertia 1,2 kgm^2 , 12 tools has the code: 0497010251:
- 0497010->hardware code;
- 251->configuration to drive the above turret.

All available codes are stated in a separate document.

IMPORTANT NOTE FOR SAFETY


400 V
CAUTION
1-TURN MAIN LINE SWITCH OFF BEFORE HANDLING PARTS IN UNIT
2-AFTER TURNING OFF THE MAIN LINE SWITCH, WAIT 4min BEFORE OPENING THE DRIVER PROTECTION COVER

Do not manipulate the inside of the unit
Only personnel authorized by Duplomatic may manipulate the inside of this unit.

Do not manipulate the connectors with the unit connected to AC power.
Before manipulating the connectors (inputs/outputs, feedback, etc.) make sure that the unit is not connected to AC power.

The control unit, even after the power off of the supply, stores internally electric power until the power capacitors are charged.
Be careful when operate on it.

CE COMPLIANCE

The TMC controller belong to the International product Standard EN-61800.

The TMC controller has been tested with a turret under the condition reported as follows and obtained the compliance for: CEI EN 61800-2 and CEI EN 61800-3 and CEI EN 61800-5-1.
The utilization class for this device is C3 (use in 'second environment' or use in industrial network line not connected to civil environment).
This type of device is not intended to be used on a low-voltage public network which supplies domestic premises. Radio frequency interference is expected If used on such a network.
Therefore, the use in civil environment could generate disturbance to some electrical and electronic equipment and it needs to provide additional solutions to avoid this effect.

Before main voltage power supply of TMC controller, an external filter (non supplied) is necessary for EMC compliance when TMC controller + turret are tested as stand-alone component. A 'FINMOTOR FIN 1200-010V' EMC filter or better must be used.

The TMC controller, being transistorised drive for brushless motor, is not a safety device, and cannot work in stand-alone mode because requires supply and wiring by the installer. So it is not subject to the CE mark requirement.

By the way the CE mark is placed to show the compliance to the low-voltage directive about the electrical safety of the component. The compliance of EMC and general safety standard is in charge of the machine builder as stated also in the 2006/42/CE directive. The instruction stated in this installation manual provide a line-guide to keep the EMC compliance in almost all applications.

In order to comply with the EN-61800-5-1 it needs to respect what follows:

- The TMC controller must be connected in a TT or TN earthing system in industrial fixed network, providing Overvoltage Category III or better.
- The TMC controller must be fitted into a cabinet which provide Pollution Degree II or better, so a minimum protection degree of IP54 is required.
- The 24V DC supply (CN8) and all low voltage I/O (CN1,CN2,CN7) must be provided by 'PELV' circuits.
- An external circuit breaker (Fuses) and a power contactor must be provided on the TMC threephase main power supply.
- The cabinet must be designed in order to protect people against direct contact when the voltage is present: so mechanical interlock or automatic door-open switch-off devices must be foreseen.
- After power-off, wait more than 5 minutes before handling the TMC controller.

CAUTIONS PERFORMING VOLTAGE TEST

The TMC controller is checked in factory for voltage insulation (AC voltage routine test). So disconnect the controller when performing voltage test on the cabinet. By the way it is possible to perform standard insulation resistance test on the threephase line up to 500 VDC as stated by EN 60204-1 Standard.
Due to the presence of internal overvoltage suppressor, **it is necessary to remove the FUSE Fz** located on the bottom side of the TMC controller **before performing Voltage Test**.
The voltage test must not exceed 1500V AC for 1 sec. (as stated in EN61800-5-1).

ROHS AND WEEE DIRECTIVES

The TMC controller is a variable speed motor driver intended to be used only in large fixed machine tools, thus does not fall into the scope of ROHS and WEEE directives.

CHARACTERISTICS OF THE CONTROL UNIT

- Best path automatic selection.
- External selection of rotation direction available.
- Absolute position tracking, no reference cycle required.
- Parity control on position code.
- Position Feedback to CNC.
- Enhanced diagnostic.
- Hardware input for motor driver disable according to safety standards.
- Speed reduction for maintenance purposes with dedicated input.
- Display for diagnostic.

Parameters of the system are optimised and cannot be modified by the customer.

TECHNICAL CARACTERISTICS OF THE CONTROL UNIT

DRIVER SECTION SUPPLY	
Power input **3 Φ**	400V +15% - 10 % 50/60Hz ±2Hz 3 ~ 10 A max

tab 1

Auxiliary Supply	
DC SUPPLY (SELV)	24V DC±10% 5A max.
Digital inputs (SELV) • Type • Voltage • Current	 Sink 24 VDC ±10% 5 mA @ 24 VDC
Digital outputs SELV • Type • Max current for signals **Electrovalve Commands** • Type • Max current for electrovalve	 • Transistor MOS N.O. (Source) • 0.03 A max (overload protection) • Transistor MOS N.O. (Source) 2A max (overload protection)

tab 2

General specifications	
Operative Temperature	0 ÷ 55 °C
Humidity	5.. 95%
Vibrations	0,5 g RMS (for short period) 0,1 g RMS (continuously)

tab 3

2. ELECTRICAL CONNECTIONS

Refer to the annex diagrams at section 5:
1. : wiring diagrams for installation into the electrical cabinet.

SUPPLY

POWER SUPPLY 400 VAC 3 ~ (CN10)

(see tab1)
The control unit requires a three-phase 400 VAC input for the power card.
A power contactor on the 400 AC line must be used for emergency stop (see wiring diagram).
The 400 VAC line must be protected with external fuses 10 A. (suggested 10 A motor start).
An external filter is required to meet E.M.C. compliance (not supplied).

SUPPLY 24 VDC (CN8)

(see tab1)
The control unit requires an external 24V DC supply to build up all auxiliary supply necessary for the driver section. An external slow-type fuse of 3 A must be used to protect this supply.

PROTECTION EARTH (PE)

The terminal for Protection Earth is located on CN10, pin 4.
The metal body and heatsink of the TMC controller are internally connected to PE terminal.

FUNCTIONAL EARTH (ONLY FOR TMC SERIES 11)

A M3 screw is present on the front cover of the controller, close to CN1 connector: This is not intended to be used as PE but only for connect the shield of the cable used to connect CN1 and CN2.

SHIELD CONNECTION (ONLY FOR TMC SERIES 11)

Terminal 3 ('SG') of CN8 collects the metal body and inner shields of cable connected to CN7.
This terminal must be connected to a 'signal ground'.

TECHNICAL SPECIFICATIONS FOR POWER TRANSFORMER DESIGN

Rated primary voltage	Variable
Secondary rated voltage	400 VAC ± 10% 3 ~
Rated Power	1000 VA
Max voltage drop at 10 A rms (during acceleration)	5%
Connection	star-star or delta-star
Secondary voltage deviation	± 2%

tab 4

Important: check the voltage drop on the 400 VAC supply during acceleration, to be sure that this doesn't approach the indicated voltage limits. The centre of the star connection of the transformer's secondary must be connected to ground.

I/O SIGNALS

OUTPUTS TO CNC (FROM I/O)

LOCKED: turret locked.
INDEXD: turret in position (can be used to start axis movement).
READY (ONLINE) : when HIGH controller is ready, when LOW is in emergency/alarm.
ALPOS1, **ALPOS2**, **ALPOS4**, **ALPOS8**, **ALPOS16, ALPOS32:** current tool or alarm code according to READY signal.

OUTPUTS TO ELECTROVALVE (FROM I/O)

EVLOCK: locking valve.
EVULCK: unlocking valve.

INPUTS FROM CNC (TO I/O)

PBIT01, **PBIT02**, **PBIT04**, **PBIT08, (PBIT16):** position code bits.
PARITY: parity for position codes.
PSTART: signal for starting turret cycle.
MODE01, **MODE02** mode select code bits.
SPDSEL: selection of standard or maintenance speed.
ENABLE: hardware enable/disable control of power drive.

INPUTS FROM TURRET (TO DRIVER)

LOCKSW: turret locked switch.
MOTOVL: thermal detector switch of the motor (normally closed).
INPUT1: spare input (foreseen for live tool application).
INPUT2: spare input (foreseen for live tool application).

SELECTION OF THE NUMBER OF POSITIONS

The turret can be easily configured for different number of positions by using the PC diagnostic software.

SELECTION OF HIGH INERTIA

The turret can be easily configured to drive different ranges of inertia by using PC software No mechanical operations or part replacement are required.

SELECTION OF STANDARD/MAINTENANCE SPEED

This input can be used to slow-down immediately the turret in front of dangerous operations (door opening, maintenance operations). The speed is about the 20% of the nominal speed.
Connect the SPDSEL input to the 24VDC supply if not used. If the maintenance speed is set during the movement, it is kept until the end of positioning.

	Standard speed	**Maintenance speed**
SPDSEL	connected to 24VDC	not connected

HARDWARE DISABLE

This input can be used to secure disable the power stage in order to avoid unexpected movement of motor. This does not disconnect electrically the motor, so any maintenance to the turret requires to disconnect the three-phase power supply by means a power contactor or circuit breaker.
Inside the TMC unit, this signal follows three different paths in order to ensure the effectiveness of the disable action. There is no a feedback for this signal, so it is necessary at first to be sure that the wire connected to the ENABLE Input is separed from other wirer that could bring him to 24V DC.
It is possible to check the ENABLE signal OFF by calling a tool and verifying that TMC set the alarm 1.6.

It is necessary to foresee about 100 ms. To send PSTART signal after ENABLE is set to 24V so it is suggested to use this signal only for maintenance or manual mode, while leaving it at 24V in Automatic mode.

	Drive enabled	**Drive disabled**
ENABLE	connected to 24VDC	not connected

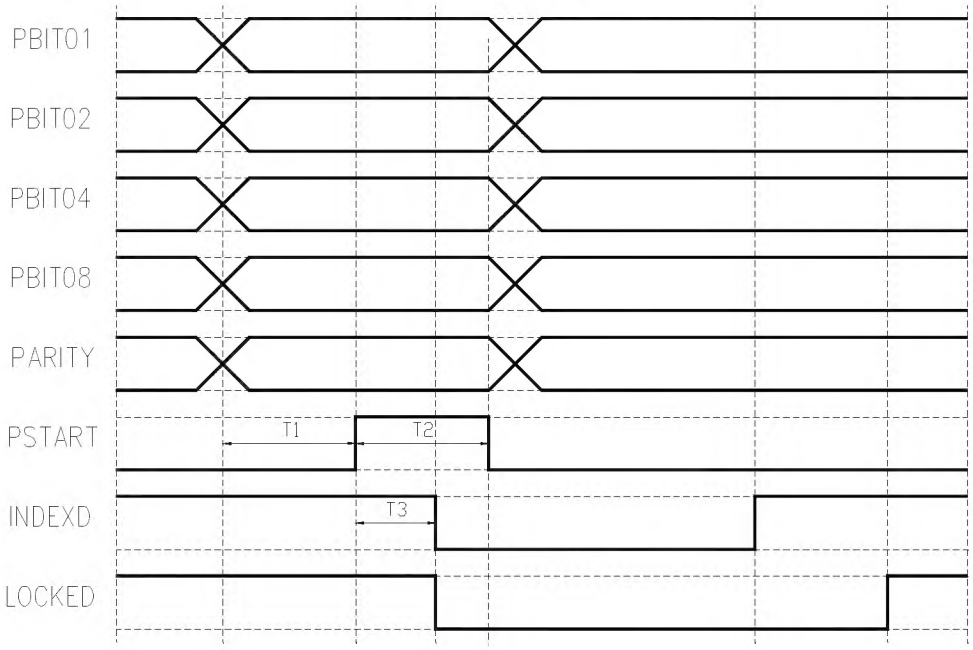
3. INTERFACING TO CNC

OPERATING FUNCTIONS

The control unit offers several operating functions (also called MODES).
Setting MODE01, MODE02 signals can make the selection of the operating functions.

N°	OPERATING FUNCTIONS	INPUTS		DESCRIPTION
		MODE01	MODE02	
0	Emergency/ Reset	0	0	Setting this mode will stop immediately the turret. Alarms can be reset setting this mode and then setting another mode.
1	Automatic shortest path	1	0	The turret will use the shortest path to reach the position required.
2	Automatic CW	0	1	The turret will always use the CW direction path to reach the position required.
3	Automatic CCW	1	1	The turret will always use the CCW direction path to reach the position required.

OPERATING FUNCTIONS DESCRIPTION



AUTOMATIC OPERATING FUNCTIONS (1,2,3)

- Set the code of the position required.
- Wait until the position code output is stable (it depends on what type of PLC/CNC outputs are used - relay, static…).
- Give the PSTART command (active on its rising front). PSTART must stay ON for more than 30 ms (T2).
- The turret confirms the reception of the start signal by setting low both INDEXD and LOCKED signal after approximately 30 ms (T3). The current position (ALPOSxx signals) is also set to 0.
- When the position requested has been reached, but the disc is not yet locked, the INDEXD signal is set high (this signal can be used to start the approach of the tool to the part to be worked on). In the same time the turret current position outputs (ALPOSxx) ar set to the new position value.
- After the disc has been locked, the LOCKED signal is set to high. The turret can work. It is possible to make a cross-check among the current position and the called one because all signals are stable.

- It is required to keep **position bits and parity code set to the last position called until the next request of tool change.**
- The PSTART signal can be reset after the confirmation of the reception, typically it must stay on for at least 30 ms (T2).

Important: the end of cycle must be detected by the LOCKED signal that changes from low to high and with the INDEXD signal high and no alarms are present.

SAME TOOL CALL

In case of the turret is already in the position called (for example change in tool offset T1.01 ..T1.02) the turret will not move or unlock/lock but the INDEXD and LOCKED signals will have the same behaviour as a normal rotation (INDEX and LOCKED low after the PSTART and then after approx. 200ms the INDEX goes HIGH and after 50 ms more the LOCKED signal goes HIGH).

INDEXD SIGNAL

The INDEXD signal must be used with the LOCKED signal to detect the end of cycle of the turret and can be ignored once the turret is locked.
The INDEXD output goes and stay LOW also when the emergency mode is set and if the three-phase power supply is OFF.
In this case, if the turret management from PLC/CNC uses the emergency mode or open the power contactor, the INDEXD signal must be used only when the turret is in cycle and then ignored.
The CNC/PLC program must check the LOCKED signal while the turret is not in cycle: if this signal goes LOW stop immediately the machine and check the cause.

ALARM CONDITIONS

When an alarm condition is detected, READY signal goes low and the INDEXD signal is low.
ALPOSxx outputs give the alarm code.
In this case the machine must be immediately stopped.
Important: the turret can show alarms in any time (also if it is not on cycle) so **check always the alarm output of the turret.**
For some kind of alarm due to the power section, it is strongly recommended to switch-off the threephase supply as soon as possible. (See alarm description).

TURRET UNKNOWN POSITION.

If the READY signal is ON but ALPOSXX are all to zero or LOCKED and INDEXD are 0, the TMC, it means that the TMC unit does not recognize a valid turret position. Move the turret is a safe place and call for a new tool (e.g. T1) to recover to a normal condition.

EXCESSIVE ELECTRICAL NOISE OR BAD WIRING DETECTION

If the turret is not in cycle and in automatic mode, any variation in POSITION BITS and PARITY must be followed by the PSTART signal.
If the PSTART does not came in about 5 seconds (T1) an alarm 5.3 is output from the turret.
Avoid to change the position code just after the turret LOCKED signal goes high (end of cycle) because this can be detected as a new position request.
See the diagnostic section to have more details.

AUTOMATIC RECOVER FOR PRESSURE/VALVES PROBLEMS

The turret will attempt three times to lock or unlock before giving an (un)clamping timeout alarm.
If the operator hear the valve operated more times during the tool change it is necessary to check the cause of the problem and remove it before a permanent failure happens.

OPERATING FUNCTION N°0: EMERGENCY / RESET

OPERATING FUNCTION N°0	INPUTS	
	MODE01	MODE02
Emergency/reset	0	0

This operating function has two purposes:
1) Stop all turret movement (**EMERGENCY**).
2) Acknowledge all alarms, if they are present (**RESET**).
It must stay on for more than **30 ms** to be read by the control unit. It isn't necessary to carry out a RESET to go into or out operating function. Meanwhile, the transition from one operating function to the other could generate a transitory condition that can be detected as an emergency request.
The INDEX signal goes low after a RESET.
The alarm output will be cleared changing from operating function N°0 to another operating function (e .g. Automatic).
In RESET condition the READY output could be LOW.
After RESET and SWITCH-ON, (starting from FW 02.09) if the turret is clamped in a valid station, READY, INDEXD, LOCKED ad ALPOSXX are set like at the end of a successful tool-change cycle.

OPERATING FUNCTION N°1,2,3: AUTOMATIC

These operating functions are normally used to drive the turret.
Just set the code of the position required, give the start signal and the turret will automatically reach the position.
1. Clear all alarms (if present);
2. Set an automatic function:

OPERATING FUNCTION N°1,2,3	INPUTS	
	MODE01	MODE02
Automatic with shortest path search	1	0
Automatic CW	0	1
Automatic CCW	1	1

3. Set the position code: (use PBIT16 only for turrets with 16 tools or more).

	POSITION												
CODE		1	2	3	4	5	6	7	8	9	10	11	12
PBIT01	0	1	0	1	0	1	0	1	0	1	0	1	0
PBIT02	0	0	1	1	0	0	1	1	0	0	1	1	0
PBIT04	0	0	0	0	1	1	1	1	0	0	0	0	1
PBIT08	0	0	0	0	0	0	0	0	1	1	1	1	1
(PBIT16)	0	0	0	0	0	0	0	0	0	0	0	0	0
PARITY	0	1	1	0	1	0	0	1	1	0	0	1	0

	POSITION												
CODE		13	14	15	16	17	18	19	20	21	22	23	24
PBIT01		1	0	1	0	1	0	1	0	1	0	1	0
PBIT02		0	1	1	0	0	1	1	0	0	1	1	0
PBIT04		1	1	1	0	0	0	0	1	1	1	1	0
PBIT08		1	1	1	0	0	0	0	0	0	0	0	1
(PBIT16)		0	0	0	1	1	1	1	1	1	1	1	1
PARITY		1	1	0	1	0	0	1	0	1	1	0	0

4. Set **PSTART** for give the confirmation of the movement within 5 s.
(It must stay ON for more than 30 ms).

4. TURRET START-UP PROCEDURE

The absolute position transducer of the turret is fixed in order to identify the position n°1 of the disc.

Every time a new TMC driver is connected to a turret, it is necessary to perform a set-up procedure in order to detect the optimal phase shift to control the turret motor.
Moreover the start-up procedure will check the position of all the tools and compensate any small error in fixing the transducer.
The start-up procedure is necessary only one time and the parameters are then stored in a permanent memory of TMC controller. It must be performed again if the TMC is moved to another turret.
By the way any TMC controller is already set-up for the DM turret delivered with in DUPLOMATIC.
The S/N of the turret is printed on the TMC controller label.
Moreover, the most important parameter will be printed on the turret certificate, in order to allow to set it in the TMC memory in case of problems.

The Start-Up procedure must be performed by the help of the Duplomatic Turret Interface Software (DTI) and described in its instruction manual.
In brief, it is necessary to install the DTI software and connect to the TMC controller.
After it needs to link to the controller and go in 'FORCE' mode.
Select the 'Service' option, select 'unlocking' and press start.
Once the turret is unclamped, press the 'menu' button and press the 'autotuning' button.
The 'autotuning' windows opens.
Press 'Tuning resolver' and wait the turret makes about 3 rounds CW, 3 rounds CCW and again 3 rounds CW.
Press then the 'Tuning tools' button: the disk is moved step by step in all positions to get the exact clamping position.
At the end the turret is ready to be used and parameters are automatically stored in TMC controller.

WARNING: the autotuning procedure must be performed with the disk applied to the turret.

5. DIAGNOSTIC

ALARMS AND WARNINGS

The electronic unit constantly executes self-diagnosis and can signal alarms condition.
An alarm is present if **READY is LOW and an ALPOSXX output is different from zero**

Turret is in normal operation if READY= ON: in this case the ALPOSxx outputs give the code of the current position.
When an alarm occours the READY = OFF: in this case ALPOSxx outputs give the alarm code in binary format (ALPOS01= LSB).

Starting from FW 2.0 there is no more separation in group and subgroup.

OUTPUTS						Actual position (READY= ON)	ALARM CODE (READY= OFF)	ALARM DESCRIPTION (READY= OFF)
ALPOS32	ALPOS16	ALPOS08	ALPOS04	ALPOS02	ALPOS01			
0	0	0	0	0	0	Out of position	0.0	No alarm
0	0	0	0	0	1	1	0.1	Non consistent parameters in memory.
0	0	0	0	1	0	2	0.2	Failure in internal power supply.
0	0	0	0	1	1	3	0.3	External 24V DC supply is too low.
0	0	0	1	0	0	4	0.4	Thermal I^2t threshold reached.
0	0	0	1	0	1	5	0.5	Motor overspeed.
0	0	0	1	1	0	6	0.6	Overload: check inertia and friction, check motor and resolver wirings.
0	0	0	1	1	1	7	0.7	Short circuit on power stage: check servomotor wiring or internal damage. (1)
0	0	1	0	0	0	8	0.8	Ground leakage in power stage, check wirings to motor and servomotor. (1)
0	0	1	0	0	1	9	0.9	Internal braking resistor circuit error. (1)
0	0	1	0	1	0	10	1.0	Trouble on power stage control section. (1)
0	0	1	0	1	1	11	1.1	Overvoltage during motor braking. Reduce inertia on the disk. (1)
0	0	1	1	0	0	12	1.2	Undervoltage on threephase
0	0	1	1	0	1	13	1.3	Short circuit on resolver power line (RPOW+, RPOW-) or broken wire on (RSIN+, RSIN-, RCOS+, RCOS-).
0	0	1	1	1	0	14	1.4	Fault on digital outputs: check for external shorts or overloads.
0	0	1	1	1	1	15	1.5	Profile generator fault.
0	1	0	0	0	0	16	1.6	HW ENABLE is not present.
0	1	0	0	0	1	17	1.7	Positioning timeout
0	1	0	0	1	0	18	1.8	Heatsink overtemperature. (1)
0	1	0	0	1	1	19	1.9	Overvoltage on threephase line. Check main supply. (1)
0	1	0	1	0	0	20	2.0	Reached maximum positioning error.
0	1	0	1	0	1	21	2.1	Timeout in cycle execution.
0	1	0	1	1	0	22	2.2	Motor overtemperature. (1)
0	1	0	1	1	1	23	2.3	The signal of Locking switch does not go OFF during unclamping.
0	1	1	0	0	0	24	2.4	The signal of Locking switch has gone ON while turret is unclamped.
0	1	1	0	0	1	N.A.	2.5	The unclamping phase is too slow, check the pressure, and purge the hydraulic circuit.
0	1	1	0	1	0	N.A.	2.6	N.A.
0	1	1	0	1	1	N.A.	2.7	N.A.
0	1	1	1	0	0	N.A.	2.8	The signal of Locking switch has gone OFF while turret is clamped.
0	1	1	1	0	1	N.A.	2.9	Clamping timeout.
0	1	1	1	1	0	N.A.	3.0	N.A.
0	1	1	1	1	1	N.A.	3.1	Need to run the the setup procedure.
1	0	0	0	0	0	N.A.	3.2	Requested tool is not existing
1	0	0	0	0	1	N.A.	3.3	Parity error on tool number request.
1	0	0	0	1	0	N.A.	3.4	PBITXX are changed but PSTART did not came on time.
1	0	0	0	1	1	N.A.	3.5	PLC set EMERGENCY MODE during turret cycle
1	0	0	1	0	0	N.A.	3.6	Trouble during setup procedure execution
1	0	0	1	0	1	N.A.	3.7	Cannot clamp during setup procedure.
1	0	0	1	1	0	N.A.	3.8	Error in D current controller. Check motor and resolver wirings.
1	0	0	1	1	1	N.A.	3.9	Error in Q current controller. Check motor and resolver wirings.
1	0	1	0	0	0	N.A.	4.0	Error in speed controller.
1	0	1	0	0	1	N.A.	4.1	Error in position controller.

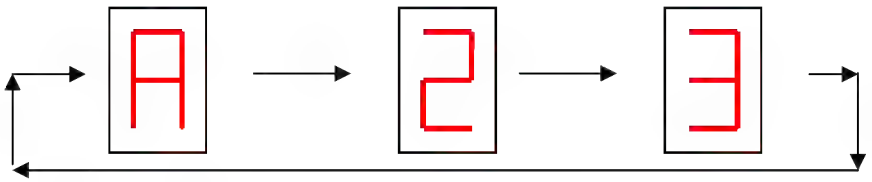
1	0	1	0	1	0	N.A.	4.2	N.A.
1	0	1	0	1	1	N.A.	4.3	N.A.
1	0	1	1	0	0	N.A.	4.4	N.A.
1	0	1	1	0	1	N.A.	4.5	N.A.
1	0	1	1	1	0	N.A.	4.6	N.A.
1	0	1	1	1	1	N.A.	4.7	N.A.
1	1	0	0	0	0	N.A.	4.8	N.A.
1	1	0	0	0	1	N.A.	4.9	N.A.
1	1	0	0	1	0	N.A.	5.0	N.A.
1	1	0	0	1	1	N.A.	5.1	N.A.
1	1	0	1	0	0	N.A.	5.2	N.A.
1	1	0	1	0	1	N.A.	5.3	N.A.
1	1	0	1	1	0	N.A.	5.4	N.A.
1	1	0	1	1	1	N.A.	5.5	N.A.
1	1	1	0	0	0	N.A.	5.6	N.A.
1	1	1	0	0	1	N.A.	5.7	N.A.
1	1	1	0	1	0	N.A.	5.8	N.A.
1	1	1	0	1	1	N.A.	5.9	N.A.
1	1	1	1	0	0	N.A.	6.0	N.A.
1	1	1	1	0	1	N.A.	6.1	N.A.
1	1	1	1	1	0	N.A.	6.2	N.A.
1	1	1	1	1	1	N.A.	6.3	N.A.

N/A = No alarm and/or position associated to this code.
(1) = **strongly suggested to switch off the threphase supply to TMC controller when power driver alarms are detected.**

Display:
A 7-segment display is available.

When the driver is in normal condition all the segments are blinking in sequence.
When the alarm is present, the display will show in sequence, A->(first alarm digit)-> (second alarm digit)

As example, the alarm 2.3 is



Alarm are stored and can be reset with EMERGENCY/RESET function.
Power off causes the reset of the active alarm.

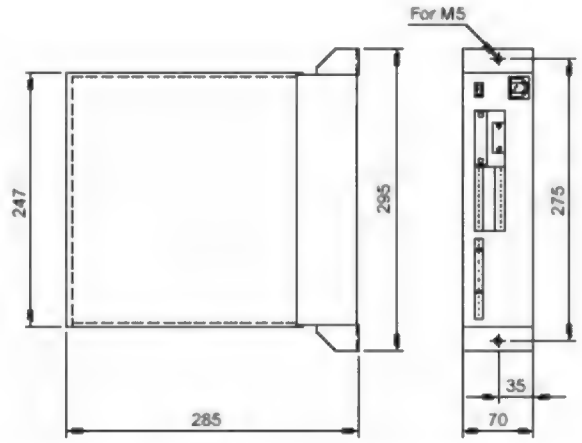
A PC software is available to improve the stat-up procedure and troubleshooting.

Fault of electronic unit:
After recognizing the fault, the problem can be easily solved.
In case of electronic unit fault, it can be easily replaced.

6. SCHEMATICS AND DRAWINGS

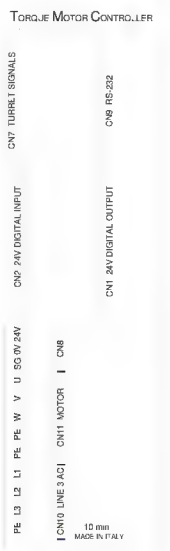
FITTING INTO THE ELECTRICAL CABINET

OVERALL DIMENSIONS



NOTE: Foresee at least 20 mm of free space on both sides and al least 100 mm above and below to allow connections and cooling airflow.

How to connect

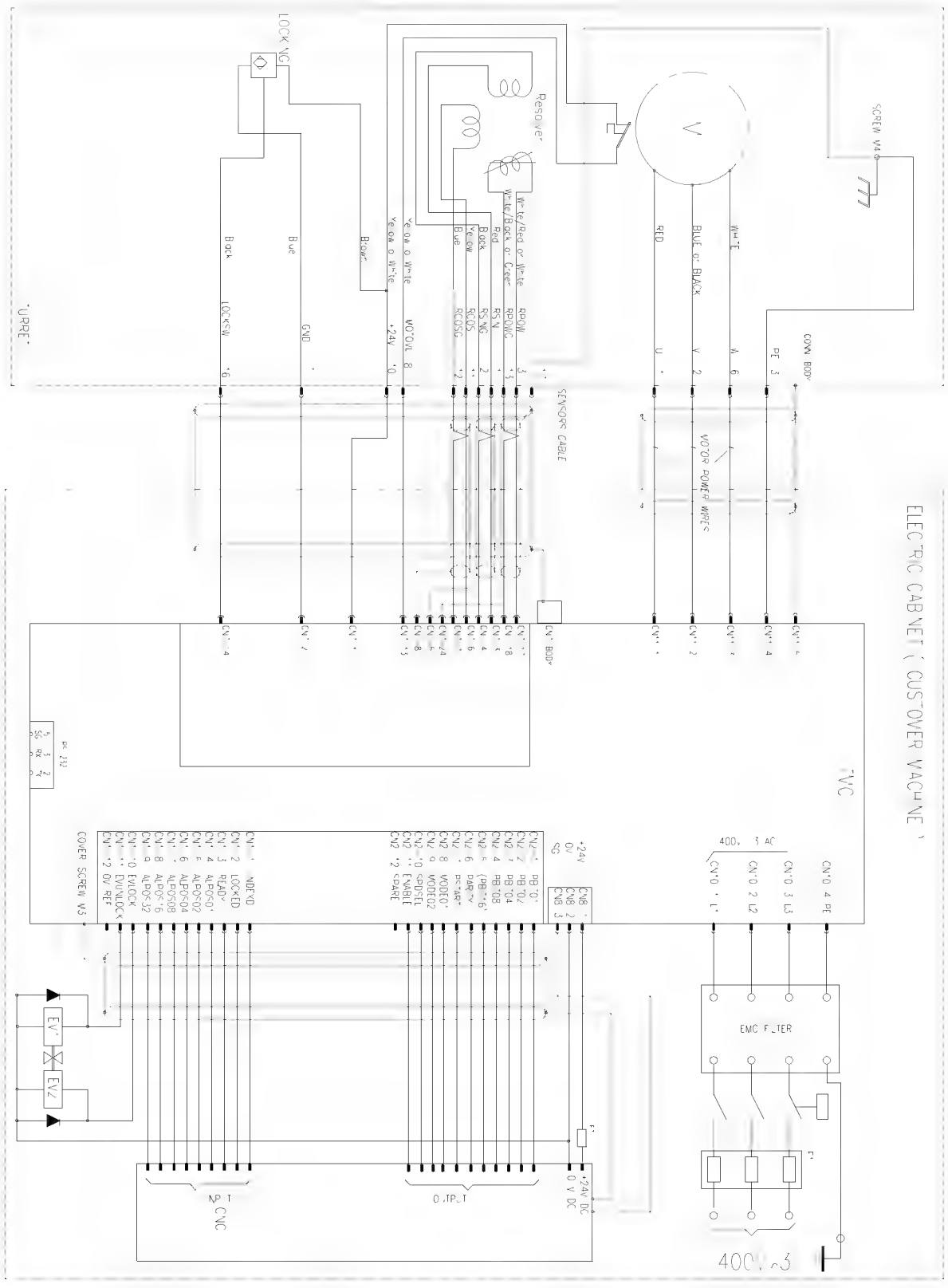


POWER CONNECTORS		CABLE SIDE
CN10	AC 3 ~ SUPPLY	PHOENIX GMSTB 2,5/4-ST-7,5
CN11	MOTOR POWER	PHOENIX GMSTB 2,5/5-ST-7,5

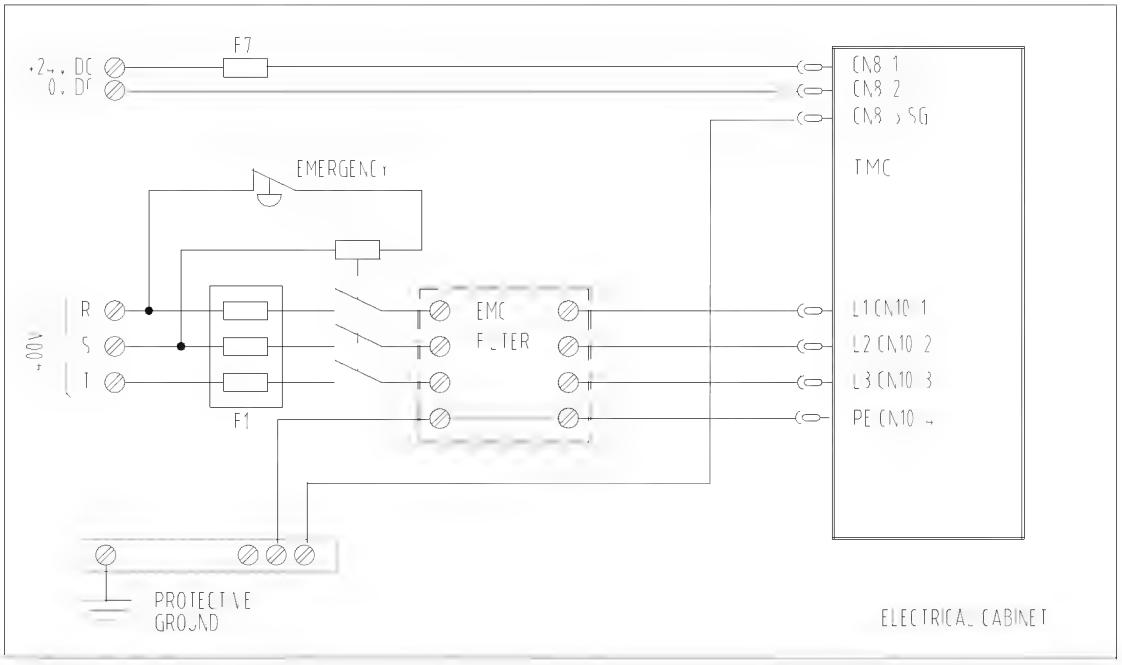
SIGNAL CONNECTORS		CABLE SIDE
CN1	DIGITAL OUTPUTS	PHOENIX MSTB 2,5/12-ST
CN2	DIGITAL INPUTS	PHOENIX MSTB 2,5/12-ST
CN8	24V DC SUPPLY	PHOENIX MSTB 2,5/3-ST
CN7	SIGNALS TO/FROM TURRET	SUB-D 25 FEMALE DIN 41652 (1)
CN9	RS232 SERIAL CONNECTION	SUB-D 9 MALE DIN 41652 (1)

(1) Not supplied.

GENERAL DRAWING FOR FITTING INTO THE ELECTRICAL CABINET



DRIVER SUPPLY FOR FITTING INTO THE ELECTRICAL CABINET

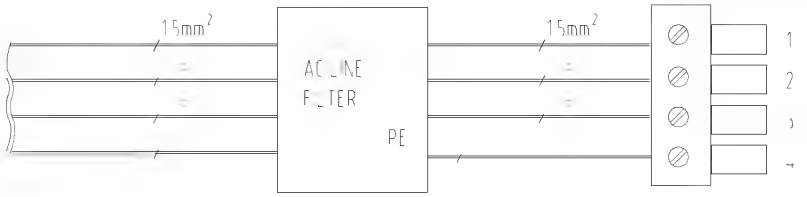


NOTES FOR THE INSTALLATION.

CABINET SIDE

CN8 3 poles Phoenix Combicon
MSTB 2,5 3-ST

CN10 4 Poles Phoenix Combicon
GMSTB 2,5/4 ST 7,5

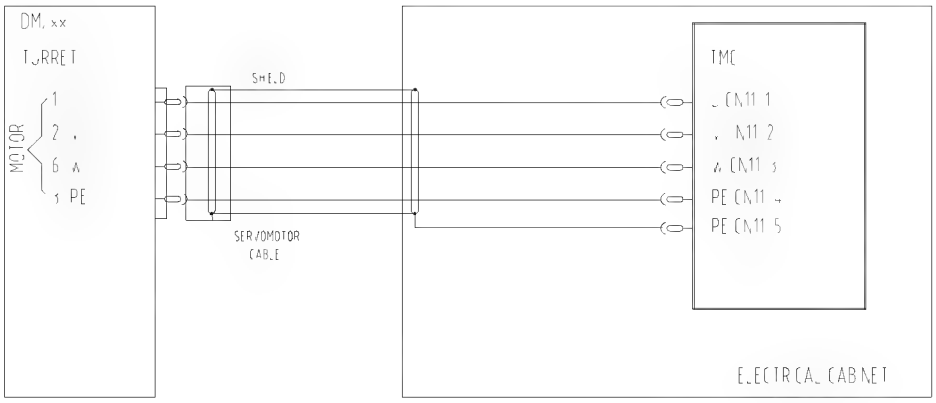


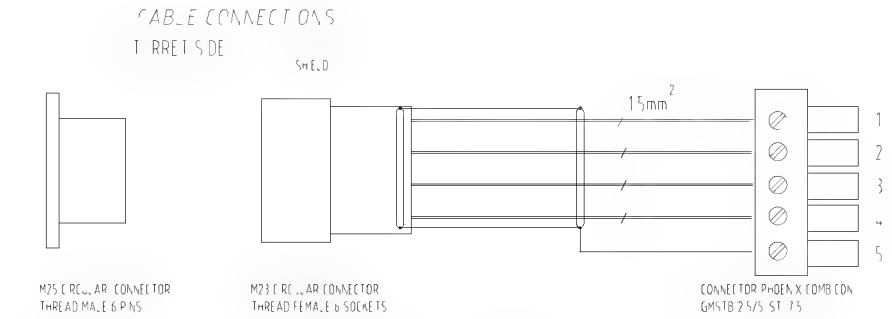
EMC FILTER	
VOLTAGE	400 V AC + 10% 50/60Hz
CURRENT	10A RMS
REQUIRED FOR EMC COMPLIANCE	
FANMOTOR P/N 1200-010 , or better	

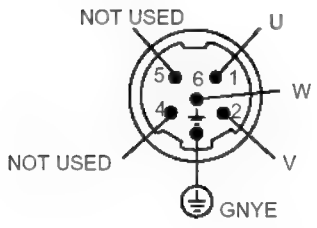
WIRES	
RECOMMENDED WIRE SECTION 1,5 mm²	
THE CABLE MUST BE SHIELDED	
TO AVOID EMC PROBLEMS	

	CAUTION
	THE SYSTEM MUST ALWAYS BE DISCONNECTED FROM THE POWER SUPPLY BEFORE ANY WORK IS CARRIED OUT

SERVOMOTOR CABLE FOR FITTING INTO THE ELECTRICAL CABINET



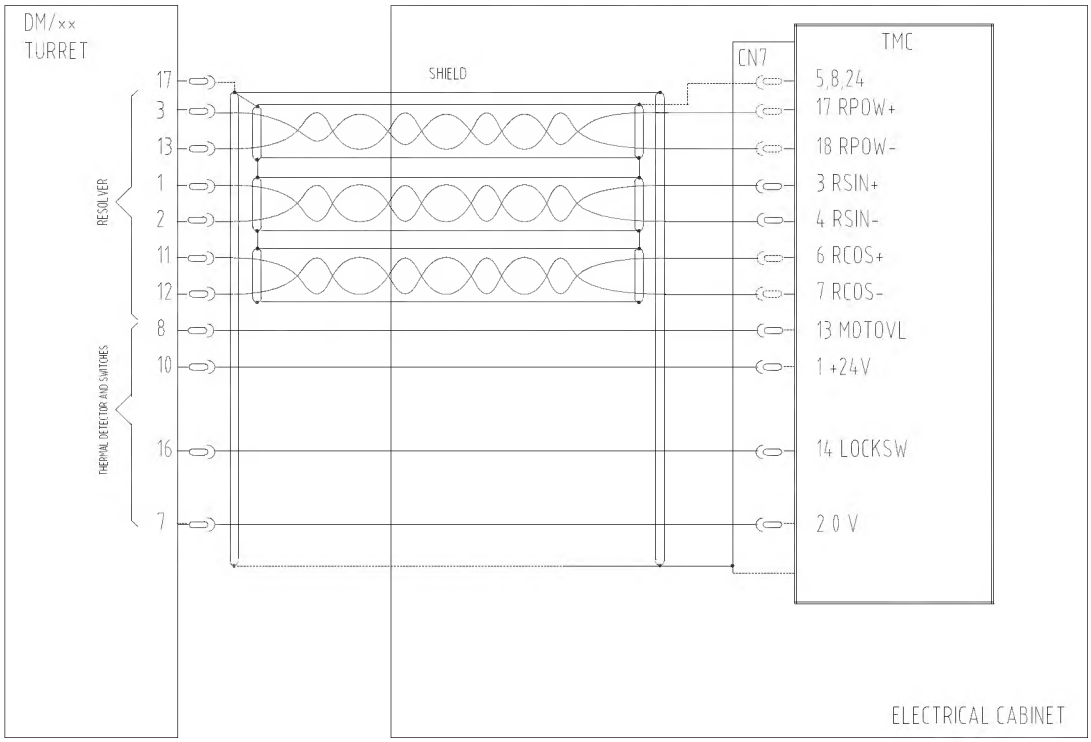




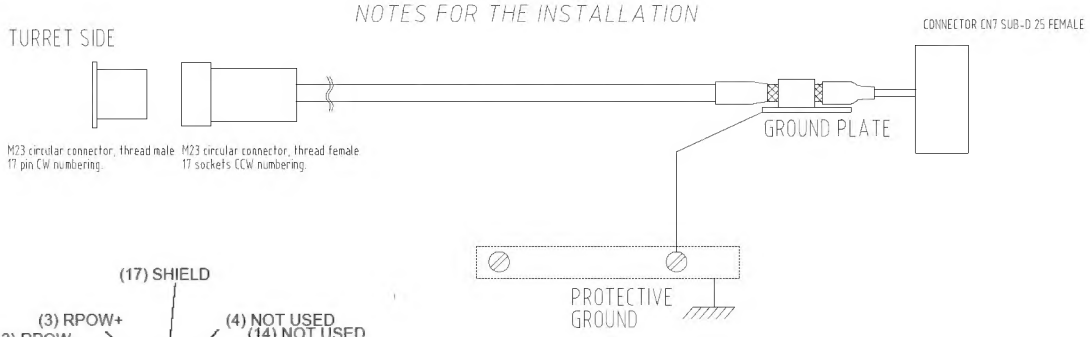
RECOMMENDED CAB.E W RES Ø 1 5 mm
THE CAB.E MUST BE SHE.DED

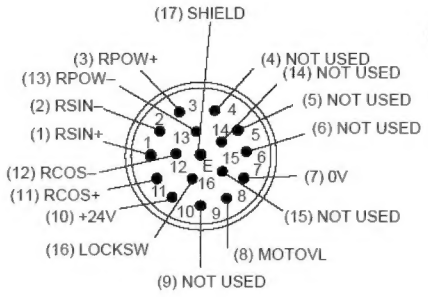
	CA.T ON
	THE S.STEM MUST A.WAYS BE D SCONNECTED FROM THE POWER SUPP.Y F ANY WORK S CARRIED OUT

RESOLVER/SWITCHES CABLE FOR FITTING INTO THE ELECTRICAL CABINET.



NOTES FOR THE INSTALLATION



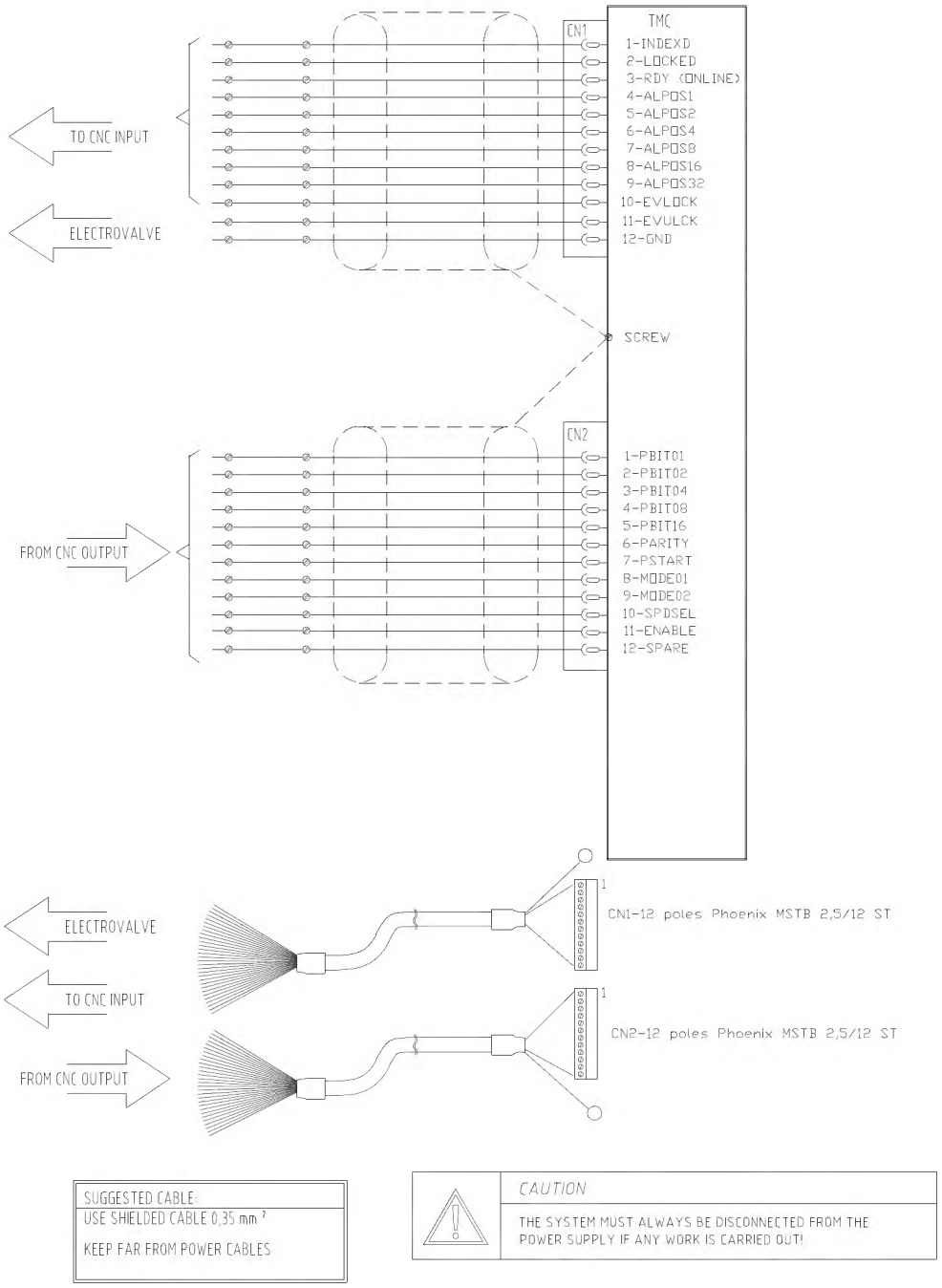


TURRET SIDE VIEW

SUGGESTED CABLE
RESOLVER: N° 3 TWISTED AND SHIELDED PAIR 26 AWG (0,14mm2) min. REST OF CABLE EXTERNAL SHIELDED.

	CAUTION
	THE SYSTEM MUST ALWAYS BE DISCONNECTED FROM THE POWER SUPPLY IF ANY WORK IS CARRIED OUT!

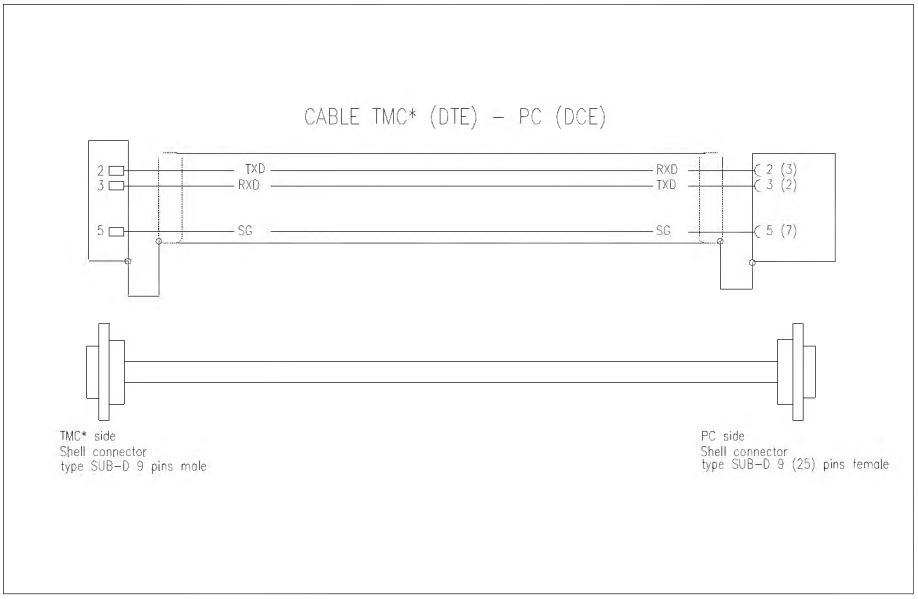
DIGITAL INPUT AND OUTPUT FOR FITTING INTO THE ELECTRICAL CABINET



SUGGESTED CABLE:
USE SHIELDED CABLE 0,35 mm ²
KEEP FAR FROM POWER CABLES

CAUTION
THE SYSTEM MUST ALWAYS BE DISCONNECTED FROM THE POWER SUPPLY IF ANY WORK IS CARRIED OUT!

SERVICE SERIAL CONNECTION



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